

REMARKS

In the Action, claims 1-20 are rejected. In response, claims 1, 2, 5, 6, 7, 8, 9, 10, 12-14 and 16 are amended, and new claims 21-23 are added. The pending claims in this application are claims 1-23, with claims 1, 9 and 13 being independent. In view of these amendments and the following comments, reconsideration and allowance are requested.

Rejections under 35 U.S.C. § 112, Second Paragraph

Claims 1-20 are rejected as being indefinite under 35 U.S.C. § 112, second paragraph. The Action indicates that the claims are unclear as to the definition of the end structural units and as to the number defined by the difference in carbon numbers between the end structural units.

In response, the independent claims are amended to clarify the features of the graft polymer composition. Specifically, claim 1 is amended to clarify that the composition comprises a first and second graft polymer where at least one of the first and second graft polymers have at least one end structural unit having at least one carbon atom. Claim 1 is further amended to clarify that the difference between the number of carbon atoms of the end structural unit of the first graft polymer and the number of carbon atoms in the end structural unit of the second graft polymer is not less than three. The number of carbon atoms of each structural end unit is defined as being the largest number of carbon atoms in the structural end units of the respective graft polymer when the graft polymer contains more than one structural end unit. The number of carbon atoms of the respective structural end unit is also defined as being zero when the polyether is derived from an alkylene oxide alone. This encompasses the embodiment where the end structural unit is a hydroxyl group as now specifically recited in claims 21-23.

The present invention is directed to a graft polymer composition prepared from at least two graft polymers, where each graft polymer has an end or terminal group and where at least one of the end groups of each graft polymer contains carbon atoms. The claims recite that the difference between the number of carbon atoms of the end group of the first graft polymer and the number of carbons of the end group of the second graft polymer is not less than 3. The amendments to claim 1 clarify these features of the invention. Accordingly, claim 1 is submitted to be in proper form under 35 U.S.C. § 112, second paragraph.

Independent claims 9 and 13, which are directed to a process for producing a graft polymer composition, are amended in a similar manner to clarify the features of the invention. As amended, it is clear that the resulting graft polymer composition produced by the process of claims 9 and 13 of the end group of the first graft polymer and the number of carbon atoms in the end group of the second graft polymer is not less than 3. Thus, claims 9 and 13 are also submitted to be in proper form under 35 U.S.C. § 112, second paragraph.

Claims 2, 5, 6, 7, 8, 12, 14 and 16 are amended to be consistent with the amendments to the respective independent claims. In view of these amendments and the above comments, Applicants request this rejection be withdrawn.

The Prior Art Rejections

Claims 1-20 are rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over EP 850963 to Yamaguchi et al. Yamaguchi et al. is cited for disclosing a detergent builder containing three different polyethers that are reacted with maleic anhydride to produce graft copolymers. Yamaguchi et al. is also cited for disclosing polyether graft copolymers having terminal end groups with various number of carbon atoms.

As noted above, the present invention is directed to a graft polymer composition and to a process for producing the graft polymer composition where the composition comprises at least two polyether based graft copolymers. Each of the graft polyether based polymers have end groups where at least one of the end groups of at least one the polyether graft copolymers contain carbon atoms. The polyether graft copolymers are blended or produced in a manner such that the difference in the number of carbon atoms of the end group of the first polyether graft copolymer and the number of carbons in the end group of the second polyether graft copolymer is not less than 3. Claims 1, 9 and 13 specifically define the number of carbon atoms in the end group of the respective polyether copolymer as being the largest number of carbon atoms of the end groups of the respective polymer. Where the polyether is produced from an alkylene oxide alone such that the end groups are a hydrogen or a hydroxyl group, the number of carbon atoms in the end groups of the respective polyether copolymer is defined as being zero. Yamaguchi et al. does not disclose or suggest these features.

Yamaguchi et al. is relevant to the extent that a graft polymer is disclosed where the graft polymer is produced from a polyether and an unsaturated carboxylic acid. Yamaguchi et al. does not disclose a blend of two different graft polymers where each of the graft polymers are produced from a polyether portion and a monoethylenically unsaturated monomer component as in the present invention. The polymer of Yamaguchi is not a blend of two graft polymers produced from a polyether chain and a monoethylenically unsaturated monomer where at least one of the graft polymers contains a terminal end structural group containing carbon atoms and where the difference in the number of carbon atoms of the terminal end group of the first graft polymer and the number of carbon atoms of the terminal end group of the second graft polymer is not less than 3. Therefore, the graft polymer

composition of claims 1-8 or the process of claims 9-20 are not disclosed or suggested in Yamaguchi et al. so that these claims are not anticipated or obvious.

Yamaguchi et al. also fails to disclose a process for producing a graft polymer composition comprising the step of adding a monoethylenically unsaturated monomer component to a mixture of at least two polyether compounds to graft polymerize the monoethylenically unsaturated monomer component at the same time on the two polyether compounds as in claim 9. Yamaguchi et al. further fails to disclose the process of claim 9 where the difference between the number of carbon atoms in an end structural unit of a first of the polyether compounds and the number of carbon atoms in an end structural unit of a second of the polyether compounds is not less than 3. Therefore, process claim 9 and claims 10-12 depending from claim 9 are not anticipated by or obvious over Yamaguchi et al.

Yamaguchi et al. also does not disclose a process for producing a graft polymer composition by blending two graft polymers where each of the graft polymers are obtained by graft polymerizing a monoethylenically unsaturated monomer onto a polyether where each of the polyether compounds have an end structural unit and where the difference between the number of carbon atoms in the respective end structural unit of each of the polyether compounds is not less than 3. Accordingly, claim 13 and claims 14-16 are not anticipated by or obvious over Yamaguchi et al.

Yamaguchi et al. also fails to disclose the liquid detergent builder of claims 17 and 18 or the liquid detergent of the claims 19 and 20 containing the graft polymer composition of claims 1 or 2 so that these claims are not anticipated by or obvious over Yamaguchi et al.

The Action refers to Example 10 of Yamaguchi et al. as disclosing a mixture of graft polymers. However, Example 10 discloses a polyethylene glycol that is reacted with maleic acid where the polyethylene glycol is a mixture of diethylene glycol, triethylene glycol and

tetraethylene glycol. The polyethylene glycol is graft polymerized with the maleic acid and acrylic acid. The resulting graft polymers of Example 10 include a polyethylene portion where each of the terminal end groups is a hydroxyl group. Thus, the graft polymers of Example 10 do not have carbon atoms such that the difference in the number of carbon atoms of a first structural end unit of a respective graft polymer and the number of carbon atoms in the end structural unit of the second respective graft polymer is zero as the definition is applied according to the claimed invention. Thus, the resulting graft polymer of Yamaguchi et al. does not have at least two graft polymers where the number of carbon atoms in the end terminal group of one of the graft polymers in the number of carbon atoms of the second graft polymer is not less than 3. Accordingly, Example 10 does not anticipate the composition or process of the claimed invention. Furthermore, this example provides no motivation or incentive to one skilled in the art to produce the composition of the present invention.

The Action refers to page 4, lines 44-46 of Yamaguchi et al. disclosing polyethers that are initiated by ethylene glycol and that the polyether can be end capped with a secondary alcohol. As noted in the Action, Yamaguchi et al. does not disclose a graft polymer composition including a first and second graft polymer where the difference between the number of carbon atoms of the end structural unit of the first graft polymer and the number of carbon atoms of the end structural unit of the second graft polymer is not less than 3. Furthermore, Yamaguchi et al. provides no motivation or incentive to one of ordinary skill in the art to produce the claimed graft polymer composition.

As disclosed on page 23 of the specification, the graft polymer composition according to the invention provides improved compatibility of the graft polymers and improves the detergent builder performance. Comparative Example 4 on pages 27 and 28 of the specification disclose a graft polymer composition where the difference in the number of

carbon atoms of the end structural unit of the first graft polymer and the number of carbon atoms in the end structural unit of the second graft polymer is one. The data in Table 1 on page 31 of the specification shows that the calcium ion scavangeability value of the composition of Comparative Example 4 is generally less than the graft polymer composition according to the claimed invention. Table 2 on page 32 also shows that the clay dispersability value of the graft polymer of Comparative Example 4 is less than a clay dispersability value of the claimed invention. The improved properties of the graft polymer composition of the claimed invention are not obvious over Yamaguchi et al. Furthermore, one skilled in the art would not reasonably expect the improved properties of the claimed composition in view of the disclosure of Yamaguchi et al. According, the difference in the number of carbon atoms of the end structural units as in the claimed invention is not an obvious modification of Yamaguchi et al.

In view of the above comments, the claims are not anticipated by or obvious over Yamaguchi et al. Therefore, independent claims 1, 9 and 13 are allowable over the art of record. The dependent claims are also allowable as depending from an allowable base claim and for reciting additional features of the invention that are not disclosed or suggested in the art of record. For example, Yamaguchi et al. does not disclose the difference in the number of carbon atoms of the end structural units being not larger than 5 as in claim 2, the acid value of claims 3 and 4, the weight of the respective main chains of the graft polymers of claim 5-8 either alone or in combination with the features of claim 1. Claims 10-12 depend from claim 9 and correspond to claims 2, 3 and 5, and thus, are allowable for the same reasons. Yamaguchi et al. also fails to disclose the acid value of claim 15 or the weight of the respective main chains of the polyether compounds of claim 16 or the difference in the number of carbon atoms of the end structural units being not larger than 5 as in claim 14 in

combination with the composition of claim 13. The art of record also fails to disclose the liquid detergent builder or the liquid detergent composition containing the graft polymer composition of claims 1 and 2 as recited in claims 17-20.

In view of these amendments and the above comments, reconsideration and allowance of the claims are requested.

Respectfully submitted,



Garrett V. Davis
Reg. No. 32,023

Roylance, Abrams, Berdo & Goodman, L.L.P.
1300 19th Street, N.W., Suite 600
Washington, D.C. 20036-1649
(202) 659-9076

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